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isés que ne sont ni de vraies plantes, ni de vrais animaux. Ce n'est qu'à force d'observations et de méditations que l'on pourra distinguer clairement les vraies plantes et les vrais animaux des autres êtres organisés qui en diffèrent assez pour avoir une autre détermination et un autre rang dans la division méthodique des productions de la nature." (Séances des Ecoles Normales, tome v. p. 277.)

We cite these authors only for the general purpose of illustrating the usual style of the suggestions and opinions frequently to be met with. Purposely, at present, we do not extend extracts of this description, nor give any such from living authors.

On the **LESTRIS RICHARDSONI** of Swainson; with a Critical Review of the Subfamily **LESTRIDINÆ.**

BY ELLIOTT COUES, M.D., U.S.A.

In the year 1831, a Jäger was described and figured in the Fauna Boreali-Americana, under the name of "*Lestris Richardsoni* Swains." This bird has been generally supposed to be the true *parasitica* of Brünnich, in the now well known *fusco-unicolor* state of plumage which all the species of *Stercorarius* pass through in arriving at maturity. Consequently, the name "*Richardsoni*" has been employed for the common Jäger, especially by American writers, to the exclusion of the prior name "*parasitica*," of Brünnich.

Examination of the works of Temminck, who, at the time in which he wrote, probably knew more about Jägers than almost any author, will show how this misapplication of a name became general.

In his edition of 1820, he is acquainted with but a single species of *Lestris*, (besides *catarractes* and *pomarinus*,) which he calls "*parasitica* Brünn." His description of the latter is made up of a mixture of the characters of *parasitica* and *Buffoni;* and the synonyms of the two are indiscriminately adduced.

In his edition of 1840, he recognizes the distinctions between the two species *parasitica* and *Buffoni;* but, unfortunately, he calls the true *parasitica* "*Richardsoni*," adducing the proper synonyms of the species under that name; while he describes the true *Buffoni* under the name of "*parasitica.*" He is thus fully aware of his mistake of 1820; for (page 498) he makes the following "*Remarque:* Comme notre article du stercoraire parasite ou labbe du manuel p. 796, renferme, ainsi qu'il vient d'être dit, les synonymes de deux espèces distinctes, (le stercoraire à filets subulés courts, et le stercoraire à longs filets,) il est necessaire de refaire en totalité toutes les indications sur ces deux espèces."

But, believing Swainson's bird to be the same as the *parasitica*, he says (page 492), in defence of the nomenclature adopted: "Shortly after the publication of the second edition of the Manual, of 1820, we became aware of the error in our article on *Lestris parasitica*, where the description and synonymy of two distinct species are confounded. Guided by Boie's observations, we had applied the name *parasitica* to the small Jäger with short tail feathers, proposing to adopt for the one with long tail feathers (the labbe à longe queue of Buffon,) the name *Buffoni;* but since some English authors,* led into error by our article, have thought that they have discovered in our *parasitica* a new species, which they call "*Richardsoni*," we are obliged to adopt their mistake, sanctioned as it is by several naturalists, and in many collections. Being, then, confident that *Lestris Richardsoni* is really the same with our *L. parasitica*, with short tail feathers, . . . we adopt here the first of these names for the short-tailed Jäger, leaving to the long-tailed species the appellation of *parasitica ;* for we take it, names and priority of discovery are not of the last importance ; all that is necessary is to be understood when we talk of species ; and for this purpose, a name sanctioned by usage, and which does not cause confusion, is far better than one which has nothing to recommend it but its priority of date."

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* i. e., Swainson, and others.

It was by this somewhat heterodox reasoning on the subject of nomenclature, that Temminck adopted for the common Jäger the name of "*Richardsoni*," and turned over the name "*parasitica*" to the long-tailed species. His example has been very generally followed, as will be seen by consulting the synonyms given in this paper. I am inclined to the opinion, however, that Swainson's bird may be a distinct species from the old *parasitica* of Brünnich, upon the following grounds:

In the very extensive series of Jägers in the Museum of the Smithsonian Institution, there are several specimens which agree among themselves in the possession of some characters which differ considerably from those of the typical *parasitica.* The whole bird is considerably larger,—the difference in the wing from the flexure amounting to nearly or quite an inch, and proportionate discrepancies existing in the tarsi and toes. The bill is longer, (though not stouter ;) its nail longer compared with the ceral portion, and its convexity more gradual. The most marked features, however, lie in the tail. While the relative proportions of the lateral feathers to the central pair are much as in *parasitica*, the whole tail is longer, more graduated, and the individual feathers somewhat broader. From the insertion to the tips of the pair of feathers next the central, measures in *parasitica* about 5½ inches ; in "*Richardsoni*" about 6½. A proportionate difference exists in the absolute total length of the central pair; though their relative lengths do not differ appreciably. The tail of the specimens under consideration is more graduated,—the amount of graduation being nearly an inch, instead of about half an inch, as in *parasitica.* The central pair seem broader than in *parasitica*, and somewhat of a different shape ; and the same may be said, though less markedly, of the lateral feathers. Comparing some of these specimens which are in the dusky stage with the corresponding state of plumage of *parasitica*, I find the dusky to be much darker,—in fact, quite of a blackish rather than of a fuliginous hue. No other differences are appreciable.

These specimens agree minutely with the plate and description of what Swainson called "*Richardsoni*," so that there cannot be the slightest doubt of the propriety of referring them to that species. The only question is, are the differences above detailed sufficient to constitute specific distinctions?

Bonaparte, in his Conspectus, ii. page 209, gives a form or variety of *parasitica* thus: "*α. L. coprotheres* Brünn. ; *Richardsoni* Swains. . . ex bor. Eur. et Am. Omni tempore et ætate obscurè unicolor." Swainson's figure also represents the bird in this *fusco-unicolor* stage ; he perhaps thinking that this feature formed a distinctive character. This, however, cannot be the case ; and I wish to be distinctly understood as throwing this out of consideration altogether in discussing the claims of the bird to specific distinction, since it is now certain that this dusky stage is merely an evidence of immaturity ; and that the bird, when adult, will have the white neck all round, and white underparts, exactly as in *parasitica.* If it is to be separated at all, this is to be done upon the grounds of the differences in size and proportion above detailed,—without the least reference to the dusky stage of plumage in which it is figured by Swainson.

While I am not thoroughly satisfied of the entire propriety of so doing, I shall, in the following Review of the subfamily, separate it specifically from the *parasitica ;* desiring to call attention to it, as at least a well-marked form, not a distinct species.

General Considerations.

Before proceeding to speak in detail of the individual species of the *Lestridinæ*, I desire to make a few remarks on the points which at the present day must be taken more especially into consideration, in carrying on an investigation of this subfamily of birds.

Although the contrary was formerly the case, yet at the present time the species of Jägers are pretty definitely ascertained,—being better known, in fact, than the species either of *Larinæ* or *Sterninæ*. This arises partly from the fact of the small number of existing species, and partly because most of the species present really very marked differences, which can hardly be overlooked by any one examining specimens with an ordinary degree of mental acumen. With the amount of knowledge which we possess at present, it would be quite impossible to mistake *Buffoni* for *parasiticus*, etc., in whatever stages of plumage they may be found; and therefore, except in one or two instances, I have thought it quite unnecessary to present any lengthy description or specific characters, for the purpose of separating one species from another. In a paper like the present, such points seem quite uncalled for.

At the same time, there is a point concerning which authors are even now at variance, and which seems to have need of all the light that can be thrown upon it. I refer to the remarkable changes of plumage which the species of one of the genera of this subfamily,—*Stercorarius*,—undergo in arriving at maturity, and more particularly that perplexing state in which the bird is uniformly dusky. From the time when Brünnich, in 1764, institutes a *Catharacta* "*coprotheres*, corpore toto fusco," etc., and then adds: "An a præcedenti sexu vel specie diversa? A quibusdam hæc pro fœmina, illa §127 (*parasitica*) pro mare habetur,"—the question has been an open one. Some authors have made a distinct species of this stage; others have given it as a variety; others still have considered this plumage indicative of age, or of season, or of sex. Modern opinions have generally agreed in considering it as simply an evidence of immaturity, and not a variety, much less a distinct species. I hope I shall be able to show in the following pages, that this latter opinion is the correct one, even if I cannot prove exactly *what* age the dusky stage is characteristic of, or whether more than one sex participates in it. To this end, I have gone into detail regarding the various ages of two of the species,—*pomarinus* and *parasiticus*.

But there is still another point in the study of the Jägers, which, being a matter of more than ordinary difficulty, demands our most patient and careful investigation. This is the *bibliography* of the subfamily. Many of the species were known to the very earliest,—even pre-Linnæan,—writers on ornithology; and, as a natural consequence, the synonymy of the various species is as intricate, and in as puzzling a state of complication, as perhaps that of any other group of birds, rendering it a peculiarly difficult task to unravel the various knotty points which present themselves for our consideration. Fortunately, however, the synonymy of most of the species is rather intricate, than doubtful; rendering it possible, perhaps, to present a tolerably accurate list of references, by careful and patient study. To this part of the subject in hand I have paid special attention, and it is believed that the lists of synonyms given are pretty full, and include all the important references. Others must judge of the accuracy of the citations, each according to his own views of the subject.

If I seem to have made any uncalled for innovations in nomenclature, I can only offer as an apology, that it is impossible to conduct an investigation into the bibliography of the subfamily without seeing that many of the names in common employ must be superseded, provided we are to pay any attention to recognized laws of nomenclature.

Family *LARIDÆ.*

Subfamily LESTRIDINÆ.

Of this, the first subfamily of the *Laridæ*, there are at present known to exist eight species, belonging to two genera. Of these, five inhabit the northern, and three the southern hemisphere. The five northern species are all represented in North America. The following analytical table will represent the characters of the species and genera sufficiently well for our present purposes. The diagnoses are purposely made as brief as possible, only the most prominent features being noticed.

§ *Analytical Table of the Genera and Species of the Lestridinæ.*

I. Staturâ maximi, et formâ robustissimi. Pedes et rostrum validi. Tarsus brevior quam digitus medius cum ungue. Rectrices mediæ latæ vix ultrà cæteras porrectæ.........Genus BUPHAGUS.

  a. Rostri longitudo poll. 2, et ultrà; altitudo ·75. Ad anguli oris 3·00 poll. Ex maria arctica..................... *B. skua.*

  b. Rostrum brevius, crassius. Ex maria antarctica........ *B. antarcticus.*

II. Staturâ minores, et formâ graciliores. Pedes et rostrum graciles. Tarsus non brevior quam digitus medius cum ungue. Cauda longior, et rectrices mediæ valdè ultrà cæteras porrectæ......... ....Genus STERCORARIUS.

  1. Tarsi posticè asperrimi. Rectrices mediæ latæ in apices ipsas.

    a. Rectrices mediæ cæteris 4 pollices longiores............ *S. pomarinus.*

  2. Tarsi posticè subasperi. Rectrices mediæ longæ, rigidæ, acuminatæ.

    a. Rectrices mediæ cæteris 4 poll. longiores......... ..... *S. parasiticus.*

    b. Similis *S. parasitico;* sed major, caudâ totâ longiorè, plus rotundata.. .... *S. Richardsoni.*

    c. Similis *S. pirasitico;* sed minor, rostro magis compresso, rectricibus mediis elongatis, apicibus rotundatis (Bp.).. *S. Hardyi.*

    d. Similis *S. parasitico.* Sed etiam minor *S. Buffono;* rectricibus mediis lineari-acutis, rachide denudata rigida, pollice et ultrà cæteras superantibus (Bp.)...... *S. spinicauda.*

  3. Tarsi posticè subasperis. Rectrices mediæ longissimæ, flexibiles, filiformes.

    a. Rectrices mediæ cæteris 8 ad 10 pollices longiores....*S. Buffoni.*

Genus BUPHAGUS Moehring.

Buphagus, Moehring, Genera Avium, 1752, page 66, No. 71. Typus *Larus catarractes*, Linn.

Stercorarius, "Brisson," Vieillot, Nouv. Dict. d'Hist. Nat., 1817, 153. Typus idem. (Sed non verus *Stercorarius*, Briss. cujus typus *Larus parasiticus*, L. est.) Gray, Genera of Birds, 1849, 651. Degland, Ornith. Europ. 1849, ii. 287. Bonaparte, Conspectus Avium, 1856, 206. Lawrence, Gen. Rep. Birds N. A. 1858, 838; et aliorum auctorum.

Catharacta, Brünnich, Orn. Bor. 1764, 32. Typus *Cath. skua* Brünn. Bonaparte, Comparative List, 1838.

Larus, (partim) Linnæus, Systema Naturæ, 1766. Gmelin, Systema, Naturæ, 1788. Latham, Index Ornithologicus, 1790. Meyer et Wolf, Tasschenbuch deutsch. 1810.

Catarractes, Pallas, Zoog. Rosso-As. 1811, ii. 308. Typus *C. skua*. Stephens, Shaw's Gen. Zool. xiii. 1825, 214.

Lestris, "Illiger," Temminck, Man. Orn. 1820—40. Typus *L. catarractes*. (Sed non verus *Lestris* Ill. cujus typus *L. parasitica* L. est.) Faber, Prodromus Isl. Orn. 1822. Lesson, Traité d'Ornith. 1831. Keyserling et Blasius, Wirbelth. Europ. 1840 ; et auctorum aliorum.

Megalestris, Bonaparte, Conspectus Avium, 1856, p. 206. Typus *Larus cataractes*, Linn.

1. Buphagus skua Coues ex Brünnich.

"*Skua Hojeri*, Ray, Synopsis Avium, 128."

Larus fuscus, Brisson, Ornithologie, vi. 1760, p. 165. "Scopoli, Bemerk. Natur-Gesch. 1770, 90."

Catharacta skua, Brünnich, Ornithologia Borealis, 1764, 33. No. 125.

Catarracta skua, Retzius, Fauna Suecica, 1800, 161, No. 123. Bonaparte, Cat. Met. Ucc. Europ. 1842, 79. Bonaparte, Rev. Crit. Degland's Ornith. Europ. 1850, 202.

Catarractes skua, Pallas, Zoographia Rosso-Asiæ, ii. 1811, 309. Stephens, Shaw's Gen. Zool. 1825, xiii. 215.

Cataractes skua, Macgillivray, Man. Orn. ii. 1842, 255.

Catarractes vulgaris, Fleming. (fide Bp.)

Catarractes fusca, Leach. (fide Bp.)

Lestris skua, Brehm. (fide Bp.)

Larus catarractes, Linnæus, Systema Naturæ, i. 1776. Gmelin, Systema Naturæ, i. 1788, 603. Latham, Index Ornithologicus, ii. 1790, 818.

Larus keeask, Latham, Index Ornithologicus, ii, 1790, 818.

Lestris catarractes, Illiger, Prodromus, 1811, 273. Faber, Prodromus Island. Ornith. 1822, 102. Temminck, Manuel d'Ornith. ii. 1820, 792. Temminck, Manuel d'Ornith. iv. 1840, 494. Bonaparte, Synopsis, 1826, No. 304. Nuttall, Man. Ornith. ii. 1834, 312. Schlegel, Rev. Crit. Ois. Eur. 1844, 84.

Lestris catharactes, Brehm, Naturg. Europ. Vög. 1823, 739.

Lestris catharractes, Schinz, Europ. Fauna, 1840, i. 387.

Lestris catarrhactes, Kaup, Sk. Ent. Europ. Thierw. 1829, 64. Keyserling et Blasius, Wirbelth. Europ. 1840, i. 239.

Stercorarius catarrhactes, Vieillot, Nouv. Dict. d'H. N. 1817, xxxii. 154. Vieillot, Fauna Franç. 1828, 385. Degland, Orn. Europ. 1849, ii. 289. Gray, Genera Avium, iii. 1849, 652.

Stercorarius catarractes, Bonaparte, Consp. Avium, 1836, ii. 206. Lawrence, General Report Birds N. A. 1858, 838.

Stercorarius cataractes, Selys-Longchamps, Fauna Belg. 1842, 155.

Stercorarius catharractes, Des Murs, Traité d'Ool. Ornith. 1860, 551.

Stercorarius pomarinus, Vieillot, Galerie d'Ois. ii. 1834, 220; sed non Temm. nec auctorum !

Sp. ch.—Above blackish brown, more or less variegated with chestnut and whitish ; each feather being dark-colored, with a spot of chestnut towards its extremity, which in turn fades into whitish along the shaft towards the tip of each feather. On the latero-nuchal region, and across the throat, the chestnut lightens into a decided reddish yellow, the white being as a well-defined, narrow, longitudinal streak on each feather. The crown, post-ocular and mental region have but little whitish. Inferiorly, the plumage is of a blended fusco-rufous, lighter than on the dorsum, with a peculiar indefinite plumbeous nuance. The wings and tail are blackish ; their rhachides white, except towards the apices ; the remiges and rectrices white for some distance from the bases. This white on the tail is entirely concealed by the long tail-coverts, but appears on the outer primaries as a conspicuous spot. The bill and claws are blackish horn ; the feet pure black.

Bill from base to tip 2·10 ; to end of cere 1·20 ; gape 3·00 ; height at base ·75 ; width a little less ; rami 1·60 ; gonys ·50 ; wing 16·00 ; tail 6·00 ; tarsus 2·70 ; middle toe and claw 3·10.

Habitat.—Seas and sea coasts of the northern hemisphere ; more particularly in higher latitudes.

It is quite unnecessary here to go into any details regarding the specific characters of so long and well known a species, and one which is so very distinct both in form and colors from any other of our continent.

I am well aware that the adoption of the name under which I present this species, may be looked upon by many ornithologists as an unnecessary, or at least as an uncalled for innovation. In defence of the nomenclature adopted, I beg leave to offer the following considerations, which, it is hoped, will exonerate me from the charge of needlessly changing names, by proving that if we are to pay any attention to recognized rules of nomenclature, such a procedure is unavoidable in the present instance, and that no other name than the one adopted can be used :

In the first place, Moehring's genus *Buphagus* is certainly based upon a bird which was afterwards the *Larus catarractes* of Linnæus. His diagnosis (vide infra*) unmistakably refers to one of the *Lestridinæ*, while the species is fortunately exactly fixed by his reference to "*Hojeri*" and "*cataractes.*" Perhaps no one of his diagnoses is more definite than this one. This being the case, the only question is, are his genera to be adopted and used in ornithology ?

I believe that the rule generally followed regarding Moehring's genera, is that they are to be adopted when they can be certainly identified, provided that they do not conflict with subsequent Linnæan appellations. Upon this principle, many of Moehring's old genera have been revived and adopted by Gray, and his example has been followed by Baird, and other ornithological writers. It is thus that such genera as *Philomachus*, *Collyrio*, *Trogon*, *Uria*, *Catarractes*, etc., have taken the precedence over more modern appellations, to which their priority entitles them. The rule, however, does not appear to have been so strictly carried out as it should be, if adhered to at all. Gray, for example, adopts *Stercorarius* of Brisson for the Jäger, remarking "that it is supposed to be *Buphagus* of Moehring." His procedure in this case is a little remarkable, since *Buphagus* is certainly identifiable ; and there is no Linnæan genus with which it can conflict,—Linnæus ranging all the Jägers known to him with the gulls, under *Larus*. With this restriction, which, it must be confessed, is rather a compliment to Linnæus, than strict justice to other writers, the genera of Moehring are to be adopted when identifiable. The fact of that author not being a binomalist,—in fact, not dealing at all with species,—does not appear to be a valid reason why his genera should be neglected any more than those of Brisson for example. I am decidedly in favor of the adoption for any genus of the first appellation that is proposed for it after the date of the first published works of Linnæus, provided there be no conflict between them: considering the introduction of a definite form of nomenclature as beginning with that illustrious writer.

Now, supposing that we do reject Moehring's *Buphagus*, let us see what will be the consequence. "*Stercorarius* Brisson 1760" is the name which of late has been most generally applied to the genus in question. But the type of Brisson's genus is not the *catarrhactes*,† but the true *parasitica*, as is evident by his elaborate description, although no specific name is given ; and hence, if it is to be used at all, it must be for the genus of which *parasitica* is typical. But Brisson was a polynomalist ; and if we refuse to adopt Moehring's names on this score, Brisson's genera must also be rejected : to which procedure, of course, no naturalist would assent.

Catharacta of Brünnich of 1764 comes next in order, and has as its type

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* *Moehring. Genera Avium*, 1752, page 66, No. 71. "*Rostrum* postice rectum, membrana callosa ad nares usque tectum, versus apicem incurvum, lateribus compressis. *Femora* extra abdomen. Digiti antici tres membrana intermedia toti cohærentes, posticus liber."

† Brisson, on page 165 of vol. vi. of his Ornithologie, ranges this species under *Larus*, calling it "Le Goelaud brun, *Larus fuscus*."

C. skua, which is the true *catarrhactes*. But here he is anticipated by Moehring, who had previously applied the name *Cataractes** to a genus of Guillemots, of which *Uria troile* is the type. This genus has been adopted for the latter birds, by Cassin, Bryant, and others; and, unless we admit the different spellings of the same word as distinct genera, which would seem quite unwarrantable, Brünnich's name must be superseded.

Lestris of Illiger (1811) being based upon the *parasitica*, I am aware of no other genera than the above, which were founded on the *Larus catarrhactes* down to 1856, when Bonaparte, in his Conspectus, proposed the name *Megalestris*. The choice then lies between Moehring's *Buphagus* and Bonaparte's *Megalestris;* and of the two, I prefer to take the former, especially as by so doing we shall be enabled to retain *Stercorarius* of Brisson for the other species of the subfamily.

Regarding the adoption of the specific name *skua*, I will merely remark that as Brünnich was as strict a binomalist as Linnæus himself, there is no reason why his specific names should not be employed in all cases when they are identifiable. The date of Brünnich's "*skua*" is 1764; that of Linnæus' "*catarractes*" is 1766.

It is a little surprising that Brisson, after instituting the genus *Stercorarius* for the Jägers, should be so far at fault regarding the proper affinities of the present species as to place it among the Gulls, under the name of *Larus fuscus*. His descriptions of all the Jägers are remarkably accurate, and so full and complete as to admit of the positive identification of all his names. In this case, and in numberless other instances, there is cause for exceeding regret that he was a polynomalist; for, had he been a strict binomalist, so that we could adopt his specific names, we should be saved a vast deal of uncertainty and profitless discussion as to the proper specific appellations to be employed.

The *Larus keeask* of Latham is certainly the present species. That author gives 22 inches as the total length, and 3 inches as the length of the bill,—dimensions which will apply to no species of *Stercorarius;* and there is no other *Buphagus* than the present inhabiting the northern hemisphere. His bird "habitat in America ad sinum Hudsonis."

The plate which Vieillot gives in his Galerie des Oiseaux, (1854) of his *Stercorarius pomarinus*, represents undoubtedly the present species; and is, so far as I am aware, the only instance of the application of the name *pomarinus* to any other species than that to which it rightfully belongs. This error seems the more surprising, since Vieillot, in 1817 and in 1828 (vide synon.), gives the species as *Stercorarius catarrhactes*.

The other synonyms of the species do not require special notice. I have endeavored to preserve the various spellings of the word *catarrhactes* by the different authors cited. I quote *Catarractes fusca* Leach, and *vulgaris* Fleming, and *Lestris skua* Brehm, on the authority of Bonaparte.

2. BUPHAGUS ANTARCTICUS Coues ex Lesson.

Lestris catarractes, Quoy et Gaimard, Voy. Uranie, Ois. p. 38. Nec auct.
Lestris antarcticus, Lesson, Traitè d'Orn. 1831, p. 606.
Stercorarius antarcticus, Bonaparte, Consp. Av. 1856, p. 207.

DIAG.—B. *Buph. skuæ* similis; sed rostro crassiore et breviore.

Habitat.—Antarctic Ocean.

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* This word affords a good illustration of the very various cacography we often find in the names of the old authors. Thus, we have *cataracta, cataractes, catharacta, catarracta, catarractes, catarrhactes*, &c. The orthography of the word will be evident if we regard its etymology. It is from κατα, and ϱηγνυμι, whence καταρρακτης, "a robber or despoiler;" the latinization of which is *catarrhactes*,—the *h* being derived from the rough aspirate over the second ρ. Brünnich's spelling of the word might perhaps lead us to suppose it derived from καθαιρω, "to cleanse or purify;" but this is evidently not the case,—the latinization of the word formed from the latter root giving us *cathartes*, Illiger's genus of American vultures.

This species is very closely related to the preceding, if it be really distinct from it. The fine series in the Museum of the Smithsonian Institution, procured by the United States Exploring Expedition under Com. Wilkes, all differ from the *skua* of Europe and America in the possession of shorter, and comparatively stouter and deeper bills, with more obtuse tips. These are the only points of discrepancy I have been able to detect in the examination of the series ; but they appear to be quite constant.

Among the series is a specimen much larger than the rest, and than the *skua* from Europe. The bill is nearly two and a third inches long, and very stout ; the wings an inch, and the tarsus a third of an inch longer than the average of European skins. It is evidently a very old individual, and the chestnut and whitish have almost entirely disappeared from both the upper and under parts, leaving the whole bird deep blackish-brown above, and a somewhat lighter brown, or fuliginous, below. The specimen is referred to in Cassin's List of the Birds of the Exploring Expedition, as "*Lestris* —— ?" Although the general appearance of the bird is really different from that of the rest of the series, I do not think that the differences presented are anything more than indicative of the great age of the specimen. A collection of American and European Jägers, obligingly furnished by Mr. D. G. Elliott for examination, contains a specimen of the true *skua* from the Atlantic Ocean, which presents a very similar condition of things. The size is greater than that of any other of the series of specimens, and the colors are nearly as uniform as in the antarctic specimen referred to. I think it more than probable that the birds of this genus continue to grow in size and proportions with increasing age, and that the colors have a tendency to become darker and more uniform under the same circumstances.

Genus STERCORARIUS Brisson.

Stercorarius, Brisson, Ornithologia, 1760, vi. (Typus *Larus parasiticus*, Linn.) et auctorum pleriq.

Catharacta (partim), Brünnich, Ornith. Borealis, 1764.

Larus (partim), Linnæus, Systema Naturæ, 1766. Gmelin, Systema Naturæ, 1788. Latham, Index Ornithologicus, 1790. Meyer et Wolf, Taschenb. Deutsch, 1810.

Lestris, Illiger, Prodromus, 1811, p. 272. (Typus *Larus parasiticus*, Linn.) Et auctorum.

Prædatrix, Vieillot, Analyse, 1816, p. 62.

Labbus, Rafinesque, 1816, fide Bp.

Coprotheres, Reichenbach, 1850.

A single genus cannot, without great latitude and looseness of definition, be made to include all the species of this subfamily. The differences between *Buphagus skua* (with its southern representative *antarcticus*) and the other known species, are very great, and strongly pronounced, if we regard stature, proportions, character of central tail feathers, changes of plumage, &c. The differences fully warrant the distribution of the species of the subfamily into two genera, which may be thus defined:

BUPHAGUS.—Bill shorter than the middle toe without the claw ; exceedingly robust ; width at base about equal to the height, which is a third of the length of culmen. Striæ and sulci numerous and well marked. Encroachment of feathers on bill moderate ; and nearly the same on both mandibles. Occiput scarcely crested. Wings only moderately long for this subfamily,—the primaries very broad, and rounded at their tips. Tail very short, broad, nearly even, the feathers truncated ; central pair projecting but little, and broad to their very tips, which are also truncated. Feet large and stout ; tarsi shorter than the middle toe and claw. Size large ; form robust and heavy ; general organization very powerful. Colors much the same over the whole body ;

not subject to any great variations with age, sex, or season. Species, *B. skua* (type) and *B. antarcticus.*

STERCORARIUS.—Bill equal to middle toe without the claw, moderately robust, height at base more than a third of culmen ; striæ and sulci fewer and more slightly marked. Encroachment of feathers on bill very great, especially on the upper mandible, where it greatly exceeds that on the lower, and is of a different outline from that of *Buphagus.* Occiput decidedly subcrested. Wings exceedingly long, the primaries narrow, tapering, with quite acute tips. Tail long ; the lateral feathers more or less graduated ; the central pair considerably, sometimes excessively, elongated, tapering and filamentous. Feet rather slender, the tarsi equal to, or slightly longer than the middle toe and claw. Size moderate or small. Form less robust, general organization much less powerful. Nearly bicolor when adult; passing through very various states of plumage before arriving at maturity. Species, *S. pomarinus, parasiticus,* (type) *Richardsoni, Hardyi, spinicauda, Buffoni.*

Of these, the five last are very strictly congeneric in every particular. *Pomarinus,* by its larger size, somewhat more powerful form, shorter and broader central tail feathers, &c., shows a slight aberration towards *Buphagus.* But in all other features the essential characters of *Stercorarius* are so strongly pronounced, that it cannot afford a link by which the two genera may be united.

? STERCORARIUS POMARINUS Vieill. ex Temm.

Larus parasiticus, Meyer et Wolf, Tasch. Deutsch. ii. 1810, 490. (Sed non Linn. nec auct.)

Larus crepidatus, Gmelin, Systema Naturæ, i. 1788, 602. Latham, Index Ornithologicus, 1790, ii. 819. (Citat *Sterc. striatum,* Briss.)

Stercorarius striatus, Brisson, Ornith. vi. 1760, 152, pl. 13, fig. 2. (Juvenis.)

Lestris striatus, Eyton, British Birds, 18—, 53.

Lestris pomarinus, Temminck, Man. Orn. ii. 1820, 793. Temminck, Man. Orn. iv. 1840, 495. Faber, Prodromus Island. Ornith. 1822, 104. Brehm, Naturg. Europ. Vögel, 1823, 741. Bonaparte, Synopsis, 1826, No. 305. Lesson, Manuel Ornith. 1828, ii.388. Kaup, Sk. Ent. Europ. Theirw. 1829, 64. Swainson et Richardson, F. B. A. 1831, ii. 429. Nuttall, Manual Ornith. ii. 1834, 315. Audubon, Ornith. Biograph. 1839, iii. p. 396. Audubon, Synopsis, 1839, 332. Audubon, Birds America, 1844, vii. 186, pl. 451. Keyserling et Blasius, Wirbelth. Europ. 1840, i. 240. Schinz, Europ. Fauna, 1840, i. 388. Schlegel, Rev. Crit. Ois. Europ. 1844, 84. Bonaparte, Cat. Met. Ucc. Eur. 1842, 80. Bonaparte, Rev. Crit. Degland's Orn. Eur. 1850, 202. Thompson, Nat. Hist. Ireland, iii. 1851, 392. Bonaparte, Conspectus Avium, ii. 1856. 207. Des Murs, Traité d'Oologie Ornith. 1860, 551.

Stercorarius pomarinus, Vieillot, Nouv. Dict. d'H. N. xxxii. 1819, 158. Vieillot, Fauna Franç. 1828, 387. Selys-longchamps, Fauna Belg. 1842, 155. Degland, Ornith. Europ. 1849, ii 291. Gray, Genera Birds, 1849, iii. 652. Lawrence, General Report Birds N. A. 1858, 838. Coues, Proc. Acad. Nat. Sc., Philada., 1861, p. 243.

Cataractes pomarinus, Stephens, Shaw's Gen. Zool. 1825, xiii. 216, pl. 24. Macgillivray, Man. Brit. Orn., ii. 1842, 256.

Coprotheres pomarinus, Reichenbach, Syst. Av. 1850, 52, pl. 328–9.

Catarractes parasita, var. *camtschatica,* Pallas, Zoograph. Rosso-Asiæ, 1811, ii. 312.

Habitat.—Seas and sea coasts of Europe, Asia and North America. Interior of Arctic America.

I will notice the stages of plumage of this species, from that of the fully adult to that of the young of the year. Having a very extensive series at command, I have endeavored to *trace* one stage from another, and point out exactly how the great changes of plumage to which the bird is subject, are produced.

Adult.—Bill horn, deepening into black; feet black. Pileum and occipital crest brownish-black; this color extending much below the eyes, and occupying the feathers on the ramus of the inferior maxilla. Acuminate feathers of the neck light yellow. Back, wings, tail, upper wing coverts, under tail coverts as far as the flanks, deep blackish-brown. Under parts, from chin to abdomen, and neck all round, (except the yellow acuminate feathers,) *pure white.*

The above is the plumage of the fully adult bird, and is comparatively not often met with. A more usual state of plumage (described by Lawrence and figured by Audubon* as "fully adult,") is as follows:

Nearly adult.—Generally as in the preceding, but with a row of brown spots across the breast; the sides under the wings transversely barred with white and brown; the purity of the dark color of the abdomen interrupted by some touches of white. The legs still wholly black, and the tail feathers projecting as much as in the fully adult.

Now, as a somewhat younger stage than the preceding, we have the following

Intermediate stage, (No. 1275.)—The band of dark spots across the breast has widened and enlarged, so that the whole breast appears brown, mottled with white; the sides under the wings are conspicuously barred with white and brown; the white of the under parts is continued down over the abdomen to the under tail coverts; the pure brown of these parts which obtains in the adult, now only appearing as transverse bars among the white. The upper tail coverts and some of the wing coverts are barred with white. The bases of the primaries are inferiorly white. The central tail feathers now only project an inch. The tarsi are quite changed in color; they are now irregularly blotched with chrome yellow,—the hind toe and nail being of this color.

The above changes are very gradual, and readily identifiable; the *quo modo* of their production may be thus summed up: In the adult the white and brown occupy distinct and well-marked regions; and the two colors are separated by trenchant lines of division. The younger the bird, the more this distinctness of definition of colors is lost,—the white invading and barring the brown, and the brown invading and mottling the white, wherever the two join. Then also the feet lose their black, and are variegated with yellow.

Besides the above, we find a state characterizable thus:

Dusky stage.—The bird is very nearly *unicolor:* blackish-brown all over; this color deepening into quite black on the pileum; lightening into fuliginous brown on the abdomen, with a slight gilding of the black on the sides of the neck. The whitish bases of the primaries exist. The feet are in the chromo-variegated condition. The central tail feathers scarcely project half an inch.

In the last edition of the Manuel d'Ornithologie, Temminck corrects various errors committed in previous editions, and gives, as his mature opinion, four "varieties" of this species. By examining his diagnoses, it will be seen at a glance that his "variety C" is the fully adult plumage above characterized; of which he says truly that it is "assez rare." His "B" is our second stage; his "A" is about our third stage; while his "D" is the fusco-unicolor stage just given. In his earlier editions he maintains that this dusky stage is absolutely independent of sex; but latterly he says that it is possible that the dusky birds are females; the white-bellied ones males. Ornithologists maintain very diverse views on this subject; but I believe it is generally supposed that this state of plumage is not indicative of either sex, but simply of immaturity.

Now I think that the four plumages which Temminck describes as adults

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* I have Audubon's original specimen before me. It agrees minutely with his plate; and is also the specimen from which Lawrence's description in the General Report was taken.

(varieties A, &c.) are really the progressive stages of the same individuals. I do not think that even the dusky stage constitutes a distinct "variety," (*i.e.*, the birds remaining in that state all through their lives ;) much less the other stages. I am of opinion that every Jäger, before arriving at full maturity, passes through each of these states: beginning with a rufo-rayed plumage—to be presently described—passing from that next into the dusky; and then assuming successively the other stages above characterized. The only question is this: What age, sex, or season is this dusky stage characteristic of? I think that it comes in next after the very young rufo-rayed plumage, for this reason. We find these dusky birds to be generally less robust than the others; with weaker bills, less elongated central tail feathers, and particolored tarsi. Now it is well known, that the younger the bird, the smaller it is, the shorter are the central tail feathers, and the more yellow the tarsi. Another argument, by analogy, is that the *S. parasiticus* is found in exactly the same unicolor state ; and from a great number of species it can be proved, I think, that in that species it supervenes directly from the rufo-rayed plumage. [See remarks under *L. parasitica.*]

The following is the plumage of birds of the year:

Young of Year.—Bill much smaller and weaker than in the adult, light colored to beyond the nostrils, when it becomes brownish-black. Feet and toes mostly bright yellow, the terminal portions of the latter black. The whole body is everywhere transversely waved with dull rufous. On the head, neck and under parts this rufous forms the predominating color; and the bands are exceedingly numerous, of about the same width as the intervening dark color. On the flanks and under tail coverts the bars become wider, and almost white in color. On the back and wing coverts the brownish black is the predominating color; and if any rufous is present, it is merely as a narrow edging to the feathers. The under wing coverts have irregularly-angular transverse waves of brownish black and white. The remiges and rectrices are brownish black, darker at their tips ; fading into whitish towards the bases of their inner vanes. On the head and neck the light rufous decidedly predominates, and seems indistinctly but thickly nebulated with dusky; this dusky forming a conspicuous spot just at the anterior canthus of the eye. (In this plumage the bird is the *Stercorarius striatus* of Brisson and the *Larus crepidatus* of Gmelin and Latham.)

There can be no doubt that the *Stercorarius striatus* of Brisson, and the *Larus crepidatus* of Gmelin and Latham, refer to this species in the very immature state of plumage just described; when the bird is considerably smaller than when adult, and is wholly rayed with rufous and dusky, with white spaces at the bases of the wing and tail feathers. The *Stercorarius crepidatus* of Vieillot, (1817,) however, is the true *parasitica*, as is also the *Lestris crepidata*, of Degland, 1838, and of Schinz, 1840. The *Lestris crepidata* of Brehm (1823) is the young of the *Buffoni.* (Vide synonyms of these species.)

Latham in his Index, page 819, gives a "*Larus crepidatus* var. *β*," which is of course also to be referred to the young *pomarinus.*

The *Larus parasiticus* of Meyer and Wolf is, I believe, the only instance of the application of that specific name to this species. The other synonyms of the species do not require any special notice, as they are quite plain and uncomplicated.

By most authors the *Catharacta cepphus* of Brünnich is considered as referring to the long-tailed species. I must confess, however, that I can hardly discover grounds for such an identification of this name; and am rather inclined to the opinion that his *cepphus* is based upon the young *pomarinus ;* as are the *crepidata* of Gmelin and Latham, and the *striatus* of Brisson. Let us look at the description for a moment. It is evident, from almost every paragraph of it, that he had in view a young bird of the year,—in the state when they are transversely rayed with dusky and rufous,—paler on the abdomen, and have the bases of the quills and rectrices white. The only point is to determine of what species it is the young. Regarding its size, Brünnich compares it with his *Catharacta skua*, saying, that it is much smaller than that species, and "Magnitudo *parasiticæ*." The young of the year of *pomarinus* is more nearly of the size of an adult of *parasitica*, than is the young of the year of the long-tailed species. The description of the colors, form, &c., which follows, agrees precisely with those of the young *pomarinus;* and when we remember that at that date the differences between the common and long-tailed Jägers were not recognized, the two species being confounded together by authors generally, (except Brisson ;) it does not appear by any means certain that Brünnich had the long-tailed species in view in drawing up the description of "*cepphus*." Had that been the case, he would probably have compared it with *parasitica* rather than with *skua*. Moreover, Latham, in his description of his *Larus crepidatus*, which is the young *pomarinus*, gives "*cepphus*, Brünn." as a synonym of that species.

Upon the whole, therefore, while I by no means insist upon the reference of the name under consideration to the *pomarinus*, I merely wish to show that it very possibly belongs to it: and that the description is too vague and uncertain to justify the use of the name for either of the species. It is for this reason that I have adopted Boie's name "*Buffoni*" for the long-tailed Jäger.

Having always professed a rigid adherence to the great law of priority in questions of nomenclature, I am, perhaps, in the present instance, rendering myself liable to be taken to task for not employing the name "*crepidatus*" of Gmelin and Latham (1788–90) for this species instead of *pomarinus* of Temminck, since the former name is in all probability based upon this species. The description is, however, short and unsatisfactory, and is, moreover, based upon the young bird of the year; and, though there cannot really be much doubt as to the species which these authors had in their minds in preparing their descriptions, still I think in view of the above considerations, that it will hardly be expedient to supersede so definite, long-known and universally employed a name as *pomarinus*. At the same time, should any one else see fit to do so, I would in future writings unhesitatingly follow his example.

4. STERCORARIUS PARASITICUS Gray ex Brünn.

?*Sterna rectricibus duabus internis longissimis*, Linn., Fn. Suec., No. 129.
?*Larus rectricibus duabus internis longissimis*, Linn., S. N., 1748.
Catharacta parasitica, Brünnich, Ornith. Borealis, 1764, 37.
Larus parasiticus, Linnæus, Syst. Nat., 1766, i. 226. Gmelin, Syst. Nat., 1788, i. 601. (Num Lath.? qui me judice potius ad longicaudatum Briss spectat.)
Cataracta parasitica, Retzius,[*] Fauna Suecica, 1800, 160.
Catarractes parasita, Pallas, Zoog. Rosso-Asiæ, ii. 1811, 310.
Lestris parasita, Keyserling et Blasius, Wirbelth. Europ., 1840, i. 240. Schlegel, Rev. Crit. Ois. Eur., 1844, 85. Bonaparte, Cat. Met. Ucc. Europ., 1842, 80. Des Murs, Traité d'Oologie Ornith., 1860, 551. Bonaparte, Rev. Crit. Degland's Orn. Eur., 1850, 202.

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[*] It is difficult, perhaps impossible, to say whether the citations of the authors before 1800 really refer to this species, or to the long-tailed Jäger. I have, however, placed them under the head of *parasitica*, for this reason: Retzius in his edition of the Fauna Suecica (of 1800) gives them as synonyms of his *parasitica*, of which his description is, "*Rectrices* 6, 6, (i.e., the central pair) cæteris 4 poll. longiores;" thus clearly referring to the true *parasitica*. Descriptions of previous authors had mostly been merely "*Rectricibus mediis longissimis*," whence the uncertainty. Retzius, however, is in error in adducing *Stercorarius longicaudatus*, Briss., as a synonym of *parasitica*.

Lestris parasitica, Illiger, Prodromus, 1811, 273. Temminck,* Man. Ornith., 1820, ii. 796, (duæ species confusæ sunt.) Faber, Prodromus Island. Orn., 1822, 105, (Nonne duæ species confusæ ?) Brehm, Naturg. Europ. Vög., 1823, 744. Kaup, Sk. Ent. Eur. Thierw., 1829, 47. Lesson, Traitè d'Ornith., 1831. 616. Schinz, Europ. Fauna, 1840, i. 390. Bonaparte, Conspectus Avium., 1856, ii. 208.

Lestris Richardsonii, ("Swains.") Temminck, Man. Orn., iv. 1840, 499. (Sed non Swains. quæ potius species distincta.) Nuttall, Man. Ornith., ii. 1834, 319. Audubon, Ornith. Biograph., iii. p. 503; Audubon, Synopsis, 1839, 332. Audubon, Birds America, 1844, vii. 190, pl. 452. Giraud, Birds L. I., 1844, 367. Schinz, Europ. Fauna, 1840, i. 392. Thompson, Nat. Hist. Ireland, 1851, iii. 394.

Cataractes Richardsoni, Macgillivray, Man. Orn., ii. 1842, 257.

Catharacta coprotheres, Brünnich, Orn. Borealis, 1764, 38, No. 138. In ætate fusco-unicolore.)

Lestris coprotheres, Des Murs, Traitè d'Oologie Ornith., 1860, 551.

Lestris parasitica var. *coprotheres*, Bonaparte, Consp. Av., 1856, ii. 209.

Stercorarius ———, Brisson, Ornith., vi. 1760, (nomen specificum nullum.)

Stercorarius crepidatus, Vieillot, Nouv. Dict. d'H. N., xxxii. 1819, 155. (Sed non *Larus crepidatus*, Gmel., Lath., qui potius juvenis *Lestris pomarinus*, Temm.)

Stercorarius cepphus, ("Leach,") Swains. et Richardson, F. B. A., ii. 1831, p. 432. Stephens, Shaw's Gen. Zool., 1825, xiii. 211, pl. 23. Degland, Ornith. Europ., 1849, ii. 295, (nec auct.)

Stercorarius parasiticus, Selys-Longchamps, Fauna Belg., 1842, 155. Gray, Genera Birds, iii. 1849, 652. Lawrence, Gen. Rep. Birds N. A., 1858, 839. Coues, Proc. Acad. Nat. Sci. Philada., 1861, p. 243.

Lestris crepidata, Degland, "Mem. Soc. Roy. de Lille, 1838, 108." Juvenis. Schinz, Europ. Fauna, 1840, i. 390, Juvenis.

Habitat.—Coast of America and Europe, more particularly in higher latitudes. Interior of Arctic America.

Pursuing the question of the general "theory of variation" in this genus, it may be well to examine closely the various stages of this its typical species. The exceedingly rich series in the Smithsonian collection enables me to trace it through all its variations.

Young of the Year in August.—Size considerably less than that of the adult, form every way more delicate. Wings more than an inch shorter; bill and feet much slenderer and weaker. Bill in some specimens light bluish horn, in others greenish olive, the terminal portion brownish black. Tarsi and greater part of the toes yellow. The bird is every where rayed and barred with rufous and brownish black. On the head and neck the rufous is of a very light ochraceous tinge, and is by far the predominating color; the dark only appearing as a delicate line along the shaft of each feather. There is an aggregation of the brown into a spot at the anterior canthus of the eye. Proceeding down the neck to the back, the longitudinal lines become larger, and gradually spread wider and wider, until between the shoulders they occupy the whole of each feather, except a narrow border of rufous; which latter is of a deeper tint than on the head. Passing down the throat to the breast, the rufous becomes decidedly lighter,—almost whitish,—while the brown, which on the throat exists only as a light longitudinal line, changes on each feather to transverse bars of about equal width with the light rufous bars with which it alternates. This pattern prevails over the whole under parts,—the transverse bands being broadest on the flanks and under tail and wing coverts, narrowest in the middle of the belly. The primaries are brownish black, narrowly tipped with rufous, their shafts yellowish, their inner webs fading basally into white. The tail has the same coloration as the wings. The central feathers project about three-fourths of an inch.

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* This is a combination of *parasitica* and *Buffoni*, as shown by the description and indescriminate citation of synonyms. This error Temminck corrects in his edition of 1840, (pp. 493, 499, 500,) where he recognizes the two species and describes them accurately: but unfortunately calls the *parasitica*, "*Richardsoni*," and the *Buffoni*, "*parasitica*."

As the bird above described grows older, the bill and feet become stouter, the cere better developed; while the rufous everywhere gives way to the darker color. No special stage can be characterized, however, until the rufous is far outweighed by the dusky. Then we have—

(No. 18652).—Size and general proportions nearly those of the adult. Bill and cere perfectly formed; feet mostly black, but with some yellow blotches. The upper parts are unadulterated with any rufous bars; the deep brownish-black pileum has appeared, and the sides of the neck have obtained their yellow nuance, which contrasts conspicuously with the fuliginous background. Evidences of immaturity, however, are found on the under parts, where the dark color is mixed with illy-defined transverse bars of ochraceous. Rufous is also found at the bend of the wing, and on the under wing and tail coverts. The primaries are still whitish baso-externally, as are also the rectrices. The central rectrices project 2½ inches, and have the tapering form of those of the adults.

By the disappearance of the little rufous mentioned above, we have arrived at a very marked and decided stage,—viz:

(No. 20362).—With the size and proportions of the adult. Wholly deep dusky; darker and more plumbeous superiorly; lighter, and with a fuliginous tinge inferiorly; the pileum quite black; the latero-nuchal yellow, well pronounced; the remiges and rectrices quite black; feet black.

Having reached this perfect dusky stage, we will go back again to the young plumage first characterized, and show how specimens occasionally seem to proceed at once towards the adult condition with the white under parts. For example—

(No. 2754).—The juvenility of the specimen is attested by its small size, delicate bill and feet, little projection of the central rectrices, general mollipilose condition of plumage, &c. The rufous of the very young bird, instead of giving way everywhere to dusky, yields to this color only on the upper parts and crown; on the sides of the head, neck, and the whole under parts, whitish being the predominating color,—the continuity of this last being interrupted by indistinctly marked dusky bars. The yellow of the sides of the neck has not yet appeared. There is the same white space on the bases of the wings and tail as exists on the very young. The central tail feathers only project about 1½ inches.

By an attentive consideration of the preceding facts, it will be evident that we have found the same very young plumage to change gradually through one series of specimens into the fusco-unicolor state; through another series into a stage which tends to pass directly into the normal plumage of the fully adult bird, without going through this dusky epoch. What can we deduce from this perplexing fact? Does one *sex* assume this dusky plumage at a certain age, and the other not? Does this dusky state constitute the normal adult plumage of one sex? Is it a *seasonal* feature, which both sexes return to at certain periods in each year?—or, finally, does it constitute a purely accidental, but constant *variety?* Authors of weight are divided on each of these points.

I reject entirely the last hypothesis,—viz: that some birds attain to this dusky stage and retain it during their lives, though they may have sprung from normally colored parents, and have normally colored progeny. Whatever age or season, or whichever sex this state of plumage indicates, I think there can be no reasonable doubt that it is a normal and constant stage which every individual of one (or both?) sexes passes through or attains to, in its progress towards maturity. The only question is, what age is to be assigned to this dusky state, and whether one or both sexes participate in it.

Leaving now speculation for facts, we have yet to notice the mature bird. Taking either the dusky state (No. 20362,) or No. 2754, we find that both tend to produce the following plumage :

Nearly mature, (No. 20144.)—Size and form of the adult. Pileum and latero-nuchal region, and whole upper parts, as in the adult. The under parts white (as in the adult), but clouded everywhere with dusky patches, most marked across the breast, on the sides, the flanks, and under tail coverts, and leaving the middle of the belly and throat nearly pure. Varying degrees of this dusky nubilation approach in some specimens nearly to the uniform dusky above characterized ; in others fade almost into the pure white of the adult, —connecting the two ages perfectly and uninterruptedly. The tarsi of those specimens most dusky have small yellow blotches ; the others not.

Now, by the complete obliteration of these dusky cloudings on the throat, breast and belly, and its increased intensity on the under tail coverts and abdomen as far as the flanks, we arrive at last at the

Adult, perfect plumage, (No. 16802).—Bill a little shorter than the head or tarsus, about equal to middle toe without the claw ; stout, about as high as broad at the base. Cere longer than the nail. Culmen broad and flattened, with a longitudinal groove on each side. Nostrils as in the other species. Curvature of culmen and tomia very gradual. Gonys short, about straight ; rami very long, a little concave ; eminentia symphysis little marked. Striæ and sulci as in the other species. Tarsi about as long as the middle toe and claw, moderately stout, somewhat roughened supero-posteriorly, but not nearly as much so as in *pomarinus*. Scutellation and reticulation of tarsi, toes, and interdigital membranes as in the other species. Tail moderately long, slightly graduated, the lateral feathers broad quite to their apices, which are somewhat truncated, the shaft slightly protruding as a small mucro ; the central pair projecting three to four inches ; rigid ; not losing much of their breadth until about four inches from their ends, when they commence to converge regularly to a quite acute apex. They have nothing of the filamentous character of those of *Buffoni*. Wings long, powerful, their rhachides rigid, their apices somewhat acute. Pileum, occipital crest, whole upper parts, deep brownish black, with a somewhat slaty tinge, and a slight but appreciable metallic nuance ; this color deepening into quite black on the wings and tail. Rhachides of primaries and rectrices whitish, except at their tips ; the inner vanes albescent baso-internally. Chin, throat, sides of head, neck all round and under parts to the vent, pure white ; the feathers of the latero-nuchal region rigid, acuminate, with disconnected fibrillæ, light yellow. Under tail coverts like the upper parts, but somewhat of a fuliginous tint ; the line of demarcation from the white of the abdomen very trenchant.

Dimensions of fully adult.—Bill above 1·40 inches ; height or width at base, about ·50. Wing, from flexure, 13·00 : tarsus, or middle toe and claw, 1·80 ; tail 5½, its centre feathers nearly 9·00.

Dimensions of young of year.—Bill above 1·30 ; height or width at base ·40 ; wing 12·00 ; tarsi, or middle toe and claw, 1·70 ; tail 5·00 ; central tail feathers not quite 6·00.

STERCORARIUS RICHARDSONI Coues ex Swainson.

Lestris Richardsoni, Swainson, Fauna Boreali-America, 1831, ii. p. 433, pl. lxxiii. sed non auctorum.

Habitat.—Interior of Arctic America.

DIAG.—S. *Stercorario parasitico* similis ; sed major, rostro, tarsis, alisque longioribus ; caudâ magis productâ et rotundatâ, rectricibus latioribus.

This species is treated of at length in the beginning of the present paper.

6. STERCORARIUS HARDYI Coues ex Bonap.

Lestris Hardyi, Bonaparte, Comptes Rendus Acad. Sciences, 1856, p. 20. Tab. Longip. species 5. Bonaparte, Conspectus Avium., ii. 1856, 210.

DIAG.—"Similis *Lestrido parasiticæ ;* sed minor, et rostro magis compresso ; rectricibus elongatis mediis apice rotundatis."—(Bp.)

Habitat.—Southern oceans, between Philippine and Sandwich islands.

I am only acquainted with this species through the notices of Bonaparte, above cited. The diagnosis is copied from the Conspectus Avium. The species is evidently very closely related to the *parasitica*, if it be really distinct from it.

7. STERCORARIUS SPINICAUDA Coues ex Hardy.

Lestris spinicauda, "Hardy." Bonaparte, Comptes Rendus Ac. Sciences, 1855. Bonaparte, Conspectus Avium, 1856, ii. 210.

DIAG.—"Similis *L. Hardyi* et *parasitico ;* sed etiam minor *Lestrido ceppho ;* cauda truncata ; rectricibus mediis lineari-acutis, rachide denudata, rigida , pollice et ultra cæteras superantibus ; rostro brevi, robusto."—(Bp.)

Habitat.—Coast of Africa, near St. Helena.

A species with which, like the *S. Hardyi*, I am autoptically unacquainted. If, however, the above characters really obtain, they would seem abundantly sufficient to distinguish it. The diagnosis is copied from Bonaparte.

8. STERCORARIUS BUFFONI Coues ex Boie.

Stercorarius longicaudatus, Brisson, Ornith., 1760, vi. 155. Vieillot, Nouv. Dict. d'H. N. 1819, xxxii. 157. Degland, Ornith. Europ., 1849, ii. 298. Selys-Longchamps, Fauna Belg., 1842, 156.

Leslris longicaudatus, Thompson, N. H. Ireland, iii. 1851, 399.

Cataractes longecauda, Macgillivray, Man. Orn., ii. 1842, 258.

??Catharacta cepphus, Brünnich, Orn. Bor., 1764, 36.

Cataractes parasitica, Macgillivray, Brit. Birds, v.

Lestris cephus, Keyserling et Blasius, Wirbelth. Europ., i. 1840, 240. Bonaparte, Cat. Met. Ucc. Eur., 1842, 80. Bonaparte, Rev. Crit. Degland's Orn. Eur., 1850, 202. Bonaparte, Conspectus Avium., 1856, ii. 209. Des Murs, Traité d'Oologie Ornith., 1860, 551.

Stercorarius cepphus, Gray, Genera Birds, iii. 1849, 652. Lawrence, Gen. Rep. Birds N. A., 1858, 840. Coues, Proceed. Acad. Nat. Sci. Philada., 1861, p. 243.

?Larus parasiticus, Latham, Index Ornithologicus, ii. 1790, 819.

Lestris parasitica, Temminck, Man. Orn., iv. 1840, 501. (Sed non *Larus parasiticus*, Linn., Gmel. et auct.) Lesson, Man. Orn., 1828, ii. 388. Swainson and Richardson, F. B. A. 1831, ii. 430. Nuttall, Man. Orn., 1834, ii. Audubon, Orn. Biog., 1839, iii. 470. Audubon, Synopsis, 1839, 333. Audubon, Birds Amer., 1844, vii. 192, pl. 452. Giraud, Birds Long Island, 1844, 364.

Lestris Buffoni, "Boie, in Meyers' Taschenb., 1810, iii. 212." Boie, Isis, 1822, 562 et 576. Bonaparte, Synop. Birds N. A. 1826, No. 306. Lesson, Traité d'Ornith., 1831, 616. Kaup, Sk. Ent. Eur. Thierw., 1829, 47. Schinz, Europ. Fauna, 1840, i. 391. Schlegel, Rev. Crit. Ois. Eur., 1844, 85.

Lestris Lessoni, Degland, "Mem. Acad. Roy. de Lille, 1838." Juvenis. Schinz, Europ. Fauna, 1840, i. 392. Juvenis.

Lestris crepidata, Brehm, Naturg. Eur. Vög., 1823, 747. Nec Gm., nec Lath., nec Vieillot.

Adult, breeding plumage.—Bill dusky, its nail almost black. Tarsi deep leaden blue ; tibiæ, phalanges, interdigital membranes and claws black. Occiput subcrested, more decidedly than in any other species, forming a calotte of brownish black ; which color extends downwards on the cheeks, the feathers before and below the eye, and on the sides of the bill, being of this color. Neck all round, but especially the sides of the head and the peculiarly formed feathers on the latero-nuchal region, light straw yellow. Whole upper parts, with upper wing and tail coverts deep slate; which, on the primaries, secondaries, lateral tail feathers and distal half of central pair, deepens into a pure lustrous brownish black. Under surface of wings and tail deeper slate than the back, but not so deep as the upper surfaces. Chin, throat and upper breast white; gradually becoming obscured with dusky plumbeous, which deepens posteriorly, so that the abdomen and under tail coverts are nearly as dark as the back. Rhachides of first two or three primaries pure white, deepening into brownish black at their extreme apices; of the other primaries, and of the tail feathers (including the central pair) brown, except just at the base, deepening into quite black terminally. The inferior surfaces of all the rhachides are white for nearly their whole length.

Length of culmen 1·15 inches; gape 1·70; cere ·60; unguis about the same; gonys ·30; from feathers on sides of bill to tip ·90; wing 12·50; tail 6·25; central pair 14·00 to 16·00; the projection 8·00 to 10·00 inches; tibiæ bare ·75; tarsus 1·60; middle toe without claw 1·40.

Habitat.—Sea coasts of America and Europe, particularly in the higher latitudes. Interior of Arctic America.—(Kennicott.)

The changes of plumage of this species are strictly homologous with those of *S. parasiticus;* and it is therefore quite unnecessary to present them in this connexion.

As before remarked under head of *parasitica,* it is exceedingly difficult, if not quite impossible, to determine positively to what species the "*parasitica*" and "*cepphus*" of the older authors refer. This confusion is occasioned partly by the brief and vague diagnoses given, and partly by the fact that the two species were really confounded by authors (except Brisson) until comparatively quite a late period. Even so late as 1820 Temminck does not separate the two: his description applies to either, and the synonyms of both are indiscriminately adduced. From which state of things it results that nearly all the older names and citations may be without difficulty referred to either species. This in effect has been really done; some authors, for example, considering Brünnich's or Linnæus' *parasitica* to be the long-tailed species, and others holding a contrary opinion, until the identification of these names has become almost a matter of choice, or rather of tacit agreement among ornithologists. This is the more to be regretted since on it depends the question whether the common or the long-tailed Jäger is to be called *parasiticus.* A glance at the synonymy of the species will show that authors have been about equally divided on these points. Before the introduction of "*Richardsoni*" by Swainson, the common Jäger was usually called "*parasitica;*" but after the adoption of this name "*Richardsoni*" by Temminck, for the common Jäger, the name *parasitica* was for some years almost universally applied to the long-tailed species. In the year 1819, or thereabouts, the name of *Buffoni* was proposed by Boie for the long-tailed species, and was adopted by many writers; while others had recourse to Brisson's old name "*longicaudatus.*" Within the last few years, however, the name "*parasitica*" has again reverted to the common Jäger, while the other species has been usually called "*cepphus,*" after Brünnich. This identification of Brünnich's name is adopted by Gray, Bonaparte, and other writers. Our reasons for rather referring it to the *Stercorarius pomarinus* will be found under the head of the latter.

Granting, as it is undoubtedly wisest to do, that the *parasitica* of Brünnich, Linnæus and Gmelin, is really the common short-tailed Jäger, it still remains an open question to which species we are to refer the *Larus parasiticus* of Latham. I incline to the opinion that it is based upon the long-tailed species, for the following reason: Although the diagnosis is brief and unsatisfactory, and although the synonyms of the two species are indiscriminately adduced, (thus, *e. g.*, *Larus parasitica*, Linn. and *Catharacta parasitica*, Brünn., with *Stercorarius longicaudatus*, Briss., &c.,) yet in his further description he says of it, "21 pollices longus." The common Jäger never attains to this dimension.

Latham commits the error of giving *Stercorarius longicaudatus*, Briss., as the *male*, and *Stercorarius* ———, Briss., (without a specific name,) as the *female* of his species; whereas, these two citations really refer to the two distinct species.

The specific name "*longicaudata*" of Brisson (1760) being untenable for obvious reasons,—"*cepphus*" of Brünnich (1764) being too indefinite to warrant its employment,—"*parasitica*" of Brünnich (1764) being used for the common Jäger,—the first definite distinctive name for the long-tailed species appears to be "*Buffoni*" of Boie, (1819.) This specific appellation we accordingly adopt.

NOTE.—The present paper completes a series of brief reviews of the three most important of the four subfamilies of the Laridæ,—viz.: the Larinæ, Sterninæ and Lestridinæ. In conducting an investigation into the characters and the bibliography of these groups, with special reference to North American forms, it has been thought expedient to issue in advance a brief prodromus, so to speak, of each subfamily as soon as its examination was completed. Combining the results arrived at in the investigation of each of these groups, and making whatever additions or modifications future research may dictate, the writer hopes before long to present a more complete and elaborate Monograph of the North American forms of the Laridæ. It is contemplated to present the anatomical as well as the external characters, both of the higher groups and of the more marked species; the changes of plumage, dependent upon either age, season, sex, or pure accident, which examination of very extensive series may show; together with the bibliography of each species, and a discussion of doubtful points of nomenclature and relationship. The Monograph will be illustrated by colored plates of the bills, wings, feet, &c. of most of the species, showing exactly wherein one differs from another; and no pains will be spared to render it a complete exposition of the present state of our knowledge of this family of birds.

Synopsis of the MARINE INVERTEBRATA collected by the late Arctic Expedition, under Dr. I. I. Hayes.

BY WM. STIMPSON, M. D.

The collections of Dr. Hayes, as might be expected from the thorough search to which the Arctic regions have lately been subjected, and the characteristic paucity of forms existing there, embrace few novelties. They possess, however, great interest, from having been found in great part at localities much nearer the Pole than any previous expeditions have succeeded in reaching on the American side of the Arctic circle. They include some species hitherto found only on the European side. And, we may add, the number of species collected by Dr. Hayes is greater than that brought back by any single expedition which has yet visited those seas, as far as can be judged by published accounts.

Of the localities mentioned below, *Port Foulke* and *Littleton I.* are on the eastern or Greenland shore of Smith's Straits, in lat. 78½°. *Cape Faraday* is on the west shore of the same Straits, in lat. 79° 45′. *Godhavn* is at the southern end of Disco Island, in lat. 69° nearly.